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METL ★ Q33 L3127 D/44 ★ GB 1601-469
Easy-opening pouring and venting end for can - is formed from
blank pressed into shape and pierced to define holes

METAL CLOSURES LTD 08.08.77-GB-033204

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09.05.78 as ----- (969JB)

The metal closure for cans provides easy-opening outlets for pouring and venting. The annular pressing has a bead on its periphery for attachment to the sidewalls of a metal can in a conventional manner. The pressing is formed in a number of stages, firstly by defining the bead and centre portion.

The outlets are formed by initially pressing annular ribs into the centre portion, then piercing the ribs to define break lines which rupture when hand pressure is applied. Displaced sections (8,5) are attached to the closure by hinge portion (12,11). The break lines are sealed from below by thermoplastics material. (4pp Dwg.No.4)

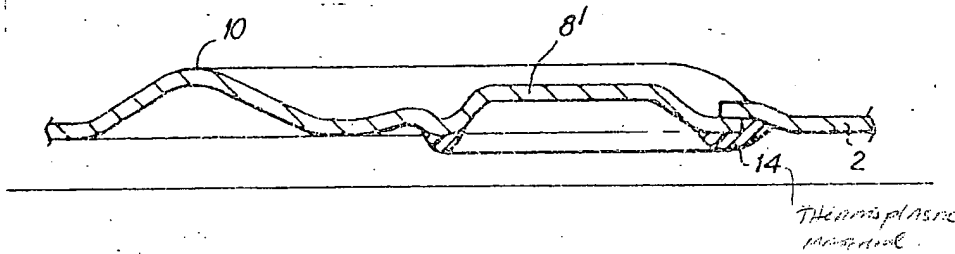


FIG. 1

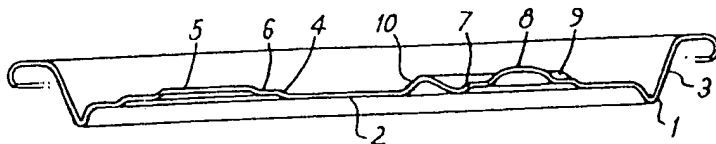


FIG. 2

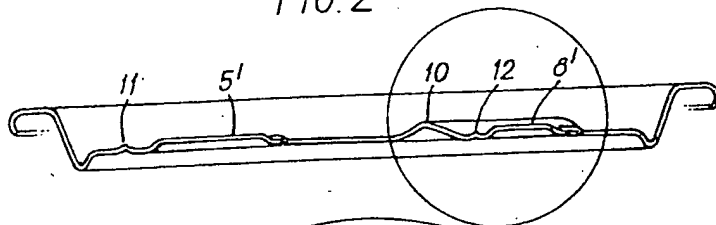


FIG. 3

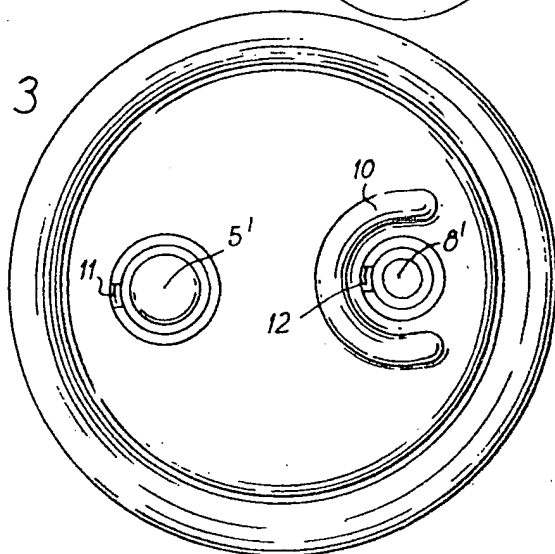
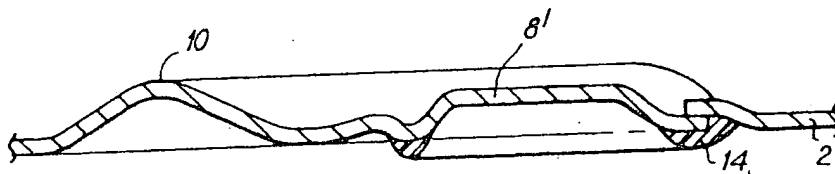


FIG. 4



PATENT SPECIFICATION

(11)

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(19)



(54) IMPROVEMENTS IN EASY-OPENING ENDS FOR CANS AND THE LIKE

(71) We, METAL CLOSURES LIMITED, a British Company, of Bromford Lane, West Bromwich, West Midlands, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to easy-opening ends which act as closures for cans and like containers, which will hereinafter be referred to as "cans" for convenience. In particular the invention relates to easy-open ends for cans intended for carbonated beverages.

Many suggestions have been put forward for can end closures, arranged to permit one or more openings to be formed in the can end by manual depression of a tab inwardly into the can. In most instances the tab is pressed out of the material forming the can end and by reworking the material of the tab and/or the portion of the can end surrounding the opening, the tab is made slightly larger than the opening so that, lying inside the can, it may seal off the opening in the manner of a conventional flap valve. For convenience the tab preferably remains attached to the can end by a small remaining hinge portion but may indeed be wholly separate from it. Where the tab is formed by piercing the can end it is normal practice for a ring of deformable plastic material to be deposited on the inner surface of the can end to cover and seal off the edge of the tab. In other suggested can ends there is an incomplete severance of the metal at the periphery of the tab which is nevertheless brought into over-lapping relation with the inner surface of the can end, since the strength of the remaining metal must be sufficiently slight to permit rupture by manual depression of the tab. In referring above to the "inner surface" of the can end reference is made to that surface which will

lie inside the can when the can has been secured to a can body.

In one form of can end of the type under discussion two separate openings are provided of different diameters. The larger opening is intended for pouring the contained liquid and the smaller opening is intended for venting gas pressure. The size of the large opening may be such that depression of the tab against the contained gas pressure by finger or thumb may be inconvenient. The small opening may be inconveniently small for pouring liquid, but since the area of such small opening for gas venting purposes may be very small the actual force required to depress its tab against contained gas pressure may likewise be small and easily exerted by finger or thumb. The very ease with which the gas vent opening tab may be depressed brings certain disadvantages in its train. It will readily be understood that the vent opening tab must project upwardly from the surrounding surface of the can end to permit it to be depressed by finger or thumb sufficiently to rupture the deposited plastic ring or remaining thickness of the metal, as the case may be. When cans are placed in random array, as is frequently done in supermarkets as a means of displaying a selection of different products or as may occur in a customer's shopping basket, the hard rim of one can may be brought against the vent opening tab of another can with sufficient force to depress the tab sufficiently to vent the can. Study of this type of can end closure shows that a limited amount of movement of the tab can take place without rupture of the seal. In the one type of can end this movement is absorbed in the plastic sealing ring and in the other type of can end a limited movement can take place by reason of the natural resilience of the can end disc. In order to prevent rupture of the seal it is in both cases necessary to limit the

accidental downward movement of the tab in relation to the surrounding can end rim. For this purpose the present invention provides an upwardly projecting formation in the can end at least partially surrounding the tab which it is desired to protect against inadvertent excess depression.

According to the present invention there is provided an easy-opening can end of the type in which the metal of the can end is wholly cut through to define two manually depressible sealing tabs which remain in hinged connection with the can end, the cut peripheral edge of each tab engaging against the underside of the can end in sealed relation therewith, the sealing tabs comprising one relatively large sealing tab and one relatively small sealing tab which has an upwardly projecting central portion, an upwardly projecting rib being formed in the can end in close proximity to and surrounding a major part of the periphery of said relatively small sealing tab, said rib projecting upwardly by a greater amount than the upwardly projecting central portion of said relatively small tab.

We have found that a part-circular rib which extends upwardly by 1-2 mm gives adequate protection to a depressible tab which normally requires to extend about 0.8 mm above the surrounding portion of the can end in order to permit adequate depression by finger or thumb. We find that a part-circular rib having a diameter of 17.5-23 mm at its crest gives adequate protection to a tab lying within it and at the same time provides adequate access for a finger or thumb to depress the tab.

A preferred can end is made in accordance with the method described in British Patent No. 1,361,784.

Reference is made hereinafter to the drawings accompanying the Provisional Specification, in which:-

Figure 1 shows a section of the can end at an intermediate stage in manufacture,

Figure 2 is a corresponding section of the completed can end,

Figure 3 is a plan view of the can end of *Figure 2*, and

Figure 4 is an enlarged view of the encircled portion of *Figure 2*.

In forming the initial pressing illustrated in *Figure 1* the initial flat disc is pressed to form a downwardly projecting peripheral rib 1 which separates the centre portion 2 from the rim flange 3 which is adapted to be connected with a can body by known technique. The rib 1 provides a relatively rigid periphery for the centre portion 2. To one side of the centre there is formed a circular upward projection 4 having a further upward projection 5 formed concentrically therewith and surrounded by a flat land 6. Diametrically opposite to the projection 6

there is an upward projection 7 with a concentric smaller upward projection 8 coaxially with it and surrounded by a land 9. A part-circular protective rib 10 is impressed into the part 2 and at this stage in manufacture does not extend to the same height above the part 2 as the top of the projection 8. It will be noticed that there is a substantial clearance between the ends of the upwardly or outwardly extending protective rib 10 and the rib 1 so that the protective rib 10 does not have any appreciable distorting effect on the peripheral rib 1.

In the next stage the lands 6 and 9 are pierced so as to provide respective pour opening tab 5' and vent opening tab 8', which are respectively left attached to the centre portion 2 by bridges 11 and 12 which act as hinges. The edges of the tabs 5' and 8' are reworked so as slightly to increase their diameter and at the same time the peripheral portions of the projections 4 and 7 are flattened so as to decrease the diameter of the respective pour and vent openings. This leads to an overlap between the free edges of the tabs 5' and 8' with the peripheries of the respective pour and vent openings, as illustrated in *Figure 2* and *Figure 4*. A ring of soft thermoplastic material 14 is deposited to seal off at the edges of the vent opening tab 8' as shown in *Figure 4* and a similar ring (not shown) is deposited at the periphery of the pour opening tab 5'. In order to vent the space within a can to which the can end illustrated in *Figures 2* to *4* is attached it is necessary to depress the vent opening tab 8' by a sufficient distance to rupture the ring 14. The downward movement of the vent opening tab 8' is resisted by the gas pressure acting upwardly on the tab 8'. When this gas pressure has been vented it is then easy to depress the pour opening tab 5' which has approximately double the surface area of the vent opening tab.

In the illustrated construction the crest of the protective rib 10 stands at a height of about 0.5 mm above the top of the tab 8', which in turn stands at a height of about 0.8 mm above the adjacent part of the centre portion 2. The ring 14 does not rupture until the centre of the tab 8' has been depressed by about 0.5 mm. The diameter of the protective rib 10 is about 20 mm in comparison with a rim diameter of about 63 mm for the complete can so that a can rim lying transversely across the vent opening and in contact with the protective rib 10 will be able to depress the tab 8' by only a limited amount. There is in consequence a very large reduction in the number of cans which are accidentally vented when a large number of cans are placed in random array in, for example, a large basket.

It will be understood that the diameter of the protective rib 10 should be kept as small

as possible consistent with the apex angle being maintained as an obtuse angle in the region of 135° to avoid localised stresses in the metal of the centre portion 2 of the can end. There is thus a necessity of providing a spacing of about 2.5-5 mm between the radially outer edge of the upward projection 7 and the crest of the protective rib 10. In the illustrated construction the diameter of the vent tab is about 8 mm and the diameter of the crest of the protective rib is about 20 mm. Thus it is generally considered that the provision of a protective rib around the periphery of the pour opening, closed by the tab 5' would serve relatively little purpose because the tab 5' projects by a less amount from the centre portion 2 and the height, to which a protective formation would be required to project would be substantially larger than for the protective rib 10, because its diameter would necessarily be considerably larger in order to provide any satisfactory protective effect.

WHAT WE CLAIM IS:-

1. An easy-opening can end of the type in which the metal of the can end is wholly cut through to define two manually depressible sealing tabs which remain in hinged connection with the can end, the cut peripheral edge of each tab engaging against the underside of the can end in sealed relation therewith, the sealing tabs comprising one relatively large sealing tab and one relatively small sealing tab which has an upwardly projecting central portion, an upwardly projecting rib being formed in the can end in close proximity to and surrounding a major part of the periphery of said relatively small sealing tab, said rib projecting upwardly by a greater amount than the upwardly projecting central portion of said relatively small tab.

2. An easy-opening can end according to claim 1 in which said rib extends around less than the whole periphery of said relatively small tab.

3. An easy-opening can end according to claim 2 in which said rib extends outwardly from said can end by 1-2 mm.

4. An easy-opening can end according to claim 2 or 3 in which the crest of a part-circular portion of said rib has a diameter in the range of 17.5 - 23 mm.

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